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A needs assessment survey of dental public health graduate education in Saudi Arabia

Dania Ebrahim Al Agili *

Department of Preventive Dental Sciences, Faculty of Dentistry, King Abdulaziz University, P.O. Box 80209, Jeddah 21589, Saudi Arabia

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Abstract *Objectives:* The Faculty of Dentistry at King Abdulaziz University (KAU) is planning to develop a master's program in dental public health (DPH). To develop a curriculum for this program, a needs assessment was conducted in order to identify the level of DPH expertise that currently exists in Saudi Arabia, to identify gaps in knowledge, and to explore current perceptions regarding this type of program.

Methods: A competency-based survey instrument was administered to private and government affiliated dental practitioners in Jeddah, Saudi Arabia. Participants' knowledge, attitudes, and competencies in DPH were assessed. In addition, questions were submitted that addressed preferred strategies of teaching, curriculum delivery methods, course content, and prerequisites for DPH. These data were combined with data previously collected from dentists holding academic positions at KAU ($n = 146$) and were analyzed using Statistical Analysis System version 9.3 software. Mean values and frequencies were calculated for the study variables. Proportional odds ratios and 95% confidence intervals were estimated to assess differences in educational preferences and DPH competencies according to age, gender, and qualification.

Results: Most of the participants (95%) reported a need for a DPH graduate program. The respondents had a basic knowledge of DPH and moderate experience in DPH competencies. A variety of preferred educational strategies and methods were identified and differences in educational preferences according to age, gender, and qualification of the respondents were identified. The responses obtained also acknowledged skills and competencies that the participants considered most important for a DPH practice and that would be important for students accepted into a DPH graduate program.

Conclusions: This needs assessment survey represents a preliminary step in establishing a DPH graduate program that addresses current gaps in knowledge and in the practice of public health

* Tel.: +966 505145554; fax: +966 2 6403316.
E-mail address: dalagili@kau.edu.sa.

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dentistry. This survey also provided valuable feedback regarding the development of course content for a graduate education program in DPH.

1. Introduction

Despite the rapid development of dental education and training in Saudi Arabia, oral disease continues to represent a considerable public burden and affects all members of the population. In a recent systematic review of dental caries studies in children that were conducted between 1988 and 2010, the estimated national prevalence of dental caries was nearly 80% for primary dentition and 70% for permanent dentition (Al Agili, 2013). Oral disease is also responsible for considerable pain and suffering, it can impair oral function, and it can affect quality of life when associated with systemic disease. Furthermore, oral disease raises the costs of dental treatment in an era when resources are constant or shrinking (United States Department of Health and Human Services, 2000). In general, oral diseases have been attributed to poor oral hygiene, lack of awareness, and an absence of community-wide oral health promotion programs (Al-Tamimi and Petersen, 1998).

Dental public health (DPH) is one of nine dental specialties recognized by the American Dental Association (ADA). This specialty focuses on oral health promotion and disease prevention through community dental education, applied dental research, and administration and delivery of dental health programs (ADA, 2013; Burt and Eklund, 2005). Thus, DPH practitioners are needed to address the goal of achieving adequate oral health for all individuals in a population (Watson and Niessen, 1998).

In Saudi Arabia, dental health services are administered by the Ministry of Health (MOH), other government institutes, such as academic institutions which belong to the Ministry of Higher Education (MOHE) and others, and the private sector. The bulk of government dental health services are provided by the MOH through hospitals, primary health care centers, and dental centers that are established throughout the country (MOH, Health Statistics Book, 2012). Currently, only a few dentists have received advanced training in DPH, and these specialists are mainly employed in academia. However, many MOH dentists without formal training in public health are involved in activities that enhance the traditional DPH infrastructure in Saudi Arabia.

Infrastructure that provides systems, people, relationships, and resources that enable government oral health programs to perform their functions is important. Currently, building infrastructure for a DPH program is a high priority for government-run oral health programs, as is the development of expertise and competence for the implementation of such strategies (ASTDD, 2000). By building a DPH program, Saudi Arabia will be able to establish national baseline oral health objectives, progress can be made toward achieving these objectives, and eventually, improvements in the oral health of the Saudi population will be achieved.

To date, there are no DPH graduate programs in Saudi Arabia, and the need for trained public health dentists to build the infrastructure and capacity of DPH programs is substantial. The purpose of this study was to complete a needs assessment for the development of a post-graduate program in DPH as part of the Faculty of Dentistry at King Abdulaziz University (KAUFD) in Jeddah, Saudi Arabia. A needs assessment is the foundation of any curriculum development process (Flink, 2003), and in this study, it helped evaluate the level of DPH expertise that currently exists, as well as the needs and overall perception of DPH, in Saudi Arabia. This assessment was conducted in two phases. The results from the first survey provided responses mainly from dentists holding academic positions at KAUFD, and these responses were previously published (Al Agili, 2012). The second phase of the assessment was conducted among professionals working in private and government public health agencies outside KAUFD. The responses obtained from both surveys were combined and analyzed.

2. Methods and subjects

A cross-sectional design and a convenient sampling strategy were used to conduct this study. Data were collected from a self-administered questionnaire that was distributed between June 2012 and December 2012. The protocol for this study was approved by the Research Ethics Committee of KAUFD.

2.1. Study participants

A questionnaire was administered to two different populations of dental professionals. First, the questionnaire was emailed to all on-site Saudi faculty members and a random sample of dental interns from the 2012 class at KAUFD (Survey I). The total number of Survey I participants was 122. The same questionnaire (Survey II) was designed using the SurveyMonkey service and was administered to a convenient sample of dental professionals that attended a Saudi Dental Society (SDS) monthly scientific activity held in Jeddah, Saudi Arabia on September 30, 2012. A total of 109 professionals attended this meeting according to the SDS administrative office in Jeddah, and the respondents to Survey II represented dental professionals employed by the MOH, private hospitals or clinics, and other government institutions such as King Fahd Armed Forces Hospital, National Guard Hospital, and King Faisal Specialist Hospital and Research Center. A few additional respondents were from dental schools other than KAUFD.

2.2. Study questionnaire

The description and details of the questionnaire used for this study are provided elsewhere (Al Agili, 2012). Briefly, the questions in Survey I addressed DPH competencies identified in 1997 by the American Association of Public Health Dentistry (AAPHD; AAPHD, 1998). Survey II was slightly

modified to also address recommendations made by the respondents to Survey I. Survey II was distributed to attendees of a SDS meeting via a letter that explained the purpose of the survey and contained an online link to the questionnaire. The letter also indicated that participants should not complete Survey II if they had previously completed Survey I, and none of the respondents to Survey II were found to have completed Survey I. This was verified by checking the demographic information provided in each survey regarding dental specialty, job description, and place of practice. Some participants also provided their names and contact information as well. One Survey II form was excluded because the respondent reported being a faculty member at KAUFD.

The questionnaires obtained sociodemographic information from the participants including age, gender, qualifications, and current job titles. The questionnaires also evaluated the participants' perceptions regarding the need, design, and development of a graduate DPH education program and the importance of DPH competencies and skills. Furthermore, a self-assessment of DPH competencies and their importance to the respondents' current jobs was included in the questionnaires. A four-point Likert scale was used to score the participants' responses to perceptions (1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree). A five-point Likert scale was used to assess participants' ranking of the importance of DPH competencies and skills in general and in regard to their own work (1 = unimportant, 2 = of little importance, 3 = moderately important, 4 = important, and 5 = very important). Finally, a six-point Likert scale was used to assess respondents' self-assessment of their DPH competencies (1–2: developing awareness/building knowledge, limited repertoire, limited experience, unaware of potential problems, or unaware of questions to ask; 3–4: applies knowledge routinely, basic repertoire; moderate amount of experience, solves problems as they arise, or aware of questions to ask and is able to access resources to answer the questions at hand; 5–6: uses knowledge fluently and effectively, advanced repertoire, extensive experience, anticipates problems before they arise, poses questions to the field, or sought out for input.

2.3. Data management and analysis

Responses to Survey I were entered in an Excel database. Responses to Survey II were downloaded from the SurveyMonkey database and then were entered in an Excel database. The results from both surveys were combined and exported to the Statistical Analysis System (SAS) software program (version 9.3) for analysis. Variables common to both surveys were analyzed together, and variables that differed between the two surveys were analyzed and reported separately.

The mean values and frequencies of the descriptive statistics were reported for all survey questions. Average scores were computed for the variables that were evaluated using four-point and five-point Likert scales. Bivariate analyses were performed to compare responses for select questions according to gender, age group (<30 years versus >30 years), and qualifications (''General'' = having a bachelor's degree in dentistry or dental hygiene versus ''specialist'' = having a graduate level degree) of the respondents. Odds ratios (ORs) and their 95% confidence intervals (CIs) were reported for dichotomized responses such as preferred type of DPH education program, while proportional odds ratios (PORs) and their 95% CIs were reported for ordinal responses such as learning strategies, curriculum delivery methods, pre-requisite education for DPH, and DPH self-competency scores. Respondents were asked to check more than one answer for each of the above questions, and each option received an individual score. The survey did not facilitate the development of a single score for these variables; therefore, each option was compared separately according to gender, age group, and qualifications.

The probability of having a higher score in the ordered value list (6 to 1, 4 to 1, or 5 to 1) is modeled. 'Female' was the reference category for gender, '<30 years' was the reference category for age, and 'general' was the reference category for qualifications. Differences in frequencies between the groups were assessed using Chi-square and Fisher's exact tests, and differences in means were assessed using t-tests. Statistical significance was set at a p-value of 0.05.

3. Results

3.1. Description of study sample

A total of 146 persons (64.5%) responded to the surveys distributed; 86.1% responded to Survey I and 40.4% responded to Survey II. Among the respondents, 56.2% were males, 43.8% were younger than 30 years of age, and 88.4% worked in government institutions. The largest proportion of respondents were affiliated with the MOHE (69.9%), followed by the MOH (9.6%), and then the private sector (8.2%). Only the primary appointment of each respondent was reported, although several participants hold more than one position (Table 1).

3.2. DPH knowledge, attitude, perception, and educational preference

Approximately 94% of the respondents agreed that there is a need for a graduate DPH education program in Saudi Arabia. The most preferred method for gaining DPH knowledge was through a seminar series (47.9%), followed by workshops (42.5%), and a master's degree program (27.4%). For Survey II respondents, a master's in DPH was reported to be the most preferred method for graduate DPH education (54%). The majority of participants also strongly agreed or agreed (scoring range: 3.7–3.4) that a structured DPH education would impact the promotion of oral health, the delivery of oral health services, the prevalence of oral diseases, research in DPH, and oral health policy decisions in Saudi Arabia (Table 2).

3.3. Teaching strategies, curriculum delivery method, and prerequisites for DPH education

The preferred teaching strategies for graduate DPH education, in descending order, were field experience, article review, collection of examples, and discussion. The least preferred strategy was sharing a database of test questions (average score = 2.9). Most respondents preferred learning mainly in a traditional classroom setting, with some electronic technologies used to access educational curriculum outside the classroom (average score = 3.3). The most preferred prerequisite qualification for DPH graduate education was a bachelor's degree in dentistry (average score = 3.5), followed closely by a bachelor's degree in dental hygiene. In contrast, having an associate degree in dental laboratory technology was the least preferred prerequisite qualification for a DPH graduate education (average score = 2.0) (Table 2).

Table 1 Descriptive statistics of study participants ($N = 146$).

Variable	Number (%)
Gender	
Male	82 (56.2)
Female	64 (43.8)
Age	
<30 years	64 (43.8)
$\geqslant 30$ years to < 40 years	40 (27.4)
$\geqslant 40$ years	41 (28.1)
Qualifications	
Bachelor's in dental sciences	68 (46.6)
Master's degree	39 (26.7)
Doctorate/Board degree	35 (24.0)
Other	4 (2.7)
Specialty by broad category	
General dentist	69 (47.3)
Specialist	64 (43.8)
Public health	9 (6.2)
Dental hygienist	3 (2.1)
Institution type	
Government	129 (88.4)
Private	12 (8.2)
Institution	
MOHE/MOH hospitals, PHC Clinics	102 (69.9)
Other government	14 (9.6)
Private hospitals/clinics	13 (8.9)
Other	11 (7.5)
Primary appointment/position	
Dental faculty	47 (32.2)
Demonstrator/resident	27 (18.4)
Intern	32 (21.9)
Consultant	11 (7.5)
General practitioner	15 (10.3)
Specialist	9 (6.2)
Dental hygienist	4 (2.7)

Note: Missing, do not know, or refused answers were removed from these statistics.
Abbreviations: MOHE, Ministry of Higher Education; MOH, Ministry of Health; PHC, primary health care.

3.4. Knowledge, skills, and abilities needed by DPH practitioners

Based on the knowledge, skills, and abilities perceived by most of the respondents from Survey I to be needed by DPH practitioners, these categories were slightly revised in Survey II to gain more information about these attributes. Overall, DPH disciplines and skills were ranked as very important or important (receiving a score $\geqslant 4$). Maximum scores were given to knowledge of public health and basic oral/dental sciences. Minimum scores were given to coalition and constituency building, advocacy skills, understanding of financing mechanisms, and grant writing.

3.5. Self-assessment of DPH competencies

Most respondents considered themselves to have a moderate amount of experience and a basic range of knowledge of DPH practices and competencies. Overall, the average score for self-assessment did not exceed a score of 4. Furthermore, most of the participants perceived these competencies to be important for their work, except for the design and understanding of oral health surveillance, which the respondents perceived as moderately important (Table 3).

Table 2 DPH knowledge, attitude, perception, and educational preferences ($N = 146$).

Knowledge of DPH	*N* (%)
Yes	140 (95.9)
No	3 (2.1)
Need for a DPH program	*N* (%)
Strongly agree	93 (63.7)
Agree	44 (30.1)
Disagree	4 (2.7)
Strongly disagree	2 (1.4)
DPH education program[†]	*N* (%)
Master's degree program	40 (27.4)
Certificate program	36 (24.7)
Workshop	62 (42.5)
Seminar series	70 (47.9)
Impact of DPH education	Average score[*]
Promotion of oral health	3.7
Delivery of oral health services	3.6
Prevalence of oral diseases	3.5
Research in dental public health	3.7
Oral health policy decisions	3.5
Teaching strategy	Average score[*]
Textbook	3.4
Lecture	3.3
Discussion/presentation	3.5
In-class seminars	3.1
Skills/activity	3.0
Laboratory	3.1
Field experience	3.6
Journal article review	3.6
Collection of examples	3.5
Homework problems	3.3
Solution to homework problems	3.2
Database of test questions	2.9
Curriculum delivery method	Average score[*]
Traditional classroom[*]	2.7
Traditional classroom with some e-learning	3.3
1/2 traditional classroom & 1/2 e-learning	3.1
E-learning with some classroom meetings	2.6
Entirely e-learning	1.6
Prerequisite education	Average score[*]
Bachelor's degree in dentistry[*]	3.5
Associate degree in dental hygiene	2.9
Bachelor's degree in dental hygiene[*]	2.6
Associate degree in dental assisting	2.5
Associate degree in dental laboratory technology	2.0

Scoring system used: 1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree.
Abbreviation: DPH, dental public health.
[†] *N* is > total because participants checked more than one answer.

3.6. Differences in study responses according to gender, age, and qualification

Overall, male and female participants did not differ in their preferred teaching strategies, curriculum delivery methods, or prerequisites for DPH education (see Supplemental Table 1 in the online version of this article). Differences were only found in the type of program preferred for obtaining DPH knowledge. Selection of a master's program for

obtaining DPH education was preferred 2.5 times more often by male respondents than by female respondents (OR = 2.5; 1.2–5.2). In contrast, women chose seminar series as the preferred means for gaining DPH education two times more often than men (OR = 0.5; 0.2–0.9).

There were significant differences in the responses based on the participants' ages (Table 4). Older respondents (⩾30 years of age) were more likely to select textbooks (POR = 5.2; CI: 2.6–10.6), discussion and presentations (POR = 2.2; CI: 1.1–4.4), journal review (POR = 4.0; CI: 1.0–15.8), and homework problems (POR = 4.0; CI: 1.8–8.9) as strategies for teaching compared to the younger respondents (<30 years of age). Older respondents also chose a bachelor's degree in dentistry (POR = 3.6; CI: 1.8–7.4) or an associate degree in dental assistance as prerequisites for DPH graduate education programs (POR = 5.3; CI: 1.3–22.1) compared to younger respondents. Younger respondents, however, were twice as likely to prefer a certificate program to gain DPH education (OR = 0.5; 0.2–1.0) and exhibited a 2.5 times higher odds (POR = 0.4; 0.2–0.7) of selecting a traditional classroom setting for curriculum delivery compared to older respondents.

Table 3 Assessment and ranking of DPH competencies.

Competency	Self-assessment*	Importance†
Ability to plan oral health programs for populations	3.1	4.2
Ability to select interventions and strategies for the prevention and control of oral diseases and the promotion of oral health	3.3	4.3
Ability to develop resources and implement and manage oral health programs for populations	2.9	4.1
Ability to incorporate ethical standards in oral health programs and activities	3.6	4.2
Ability to evaluate and monitor dental care delivery systems	3.3	4.2
Ability to design and understand the use of surveillance systems to monitor oral health	2.8	3.9
Ability to communicate and collaborate with groups and individuals on oral health issues	3.7	4.2
Ability to advocate for, implement, and evaluate public health policy, legislation, and regulations to protect and promote public oral health	2.7	4.1
Ability to critique and synthesize scientific literature	3.5	4.1
Ability to design and conduct population-based studies to answer oral and public health questions	3.2	4.2

*Score between 1 and 2: Developing awareness/building knowledge; limited repertoire; limited experience; unaware of potential problems; unaware of questions to ask.
*Score between 3 and 4: Applies knowledge routinely; basic repertoire; moderate amount of experience; solves problems as they arise; aware of questions to ask and is able to access resources to answer the questions at hand.
*Score between 5 and 6: Uses knowledge fluently and effectively; advanced repertoire; extensive experience; anticipates problems before they arise; poses questions to the field; sought out for input.
† 5 = very important; 4 = important; 3 = moderately important; 2 = of little importance; 1 = unimportant.

There were no differences in the preferred type of DPH educational program between specialists and general practitioners. Specialists expressed a higher odds of preferring textbooks (POR = 6.0; CI = 2.9–12.3), journal article reviews (POR = 5.3; CI: 1.2–23.8), and workbooks of homework problems (POR = 3.6; CI: 1.6–7.9) as teaching strategies compared to general practitioners. In addition, specialists had a 2.4 times higher odds of selecting a traditional classroom setting with some electronic learning as a curriculum delivery method compared to general practitioners. Finally, specialists exhibited approximately a 5 times higher odds for preferring a bachelor's degree in dentistry (POR = 4.6; CI = 2.2–9.7) as a prerequisite qualification for DPH education compared with general practitioners (Table 5).

3.7. Self-assessment of DPH competencies by gender, age, and qualification

There were no differences between the responses of male and female participants regarding the bivariate analysis of self-assessed competency scores. However, the bivariate analysis showed significant differences in all of the self-assessed DPH competencies according to age group and qualifications. For example, participants aged 30 years and older, as well as specialists, received higher self-assessed competency scores across all of the DPH competencies compared with younger respondents and general practice respondents (see Supplemental Tables 2 and 3 in the online version of this article).

Table 4 Preferred teaching strategy, curriculum delivery, and prerequisite education for DPH graduate education according to respondents' age (⩾30 years versus <30 years).

Variable	POR†	95% CI
Teaching strategy		
Textbook	5.2	2.6–10.6
Lecture	1.2	0.6–2.2
Discussion/presentation	2.2	1.1–4.4
In-class seminars	2.0	0.6–7.0
Skills/activity	1.8	0.5–6.6
Laboratory	0.6	0.2–2.2
Field experience	1.1	0.3–4.0
Journal article review	4.0	1.0–15.8
Collection of examples	0.7	0.3–1.6
Homework problems	4.0	1.8–8.9
Solution to homework problems	1.8	0.8–3.8
Database of test questions	1.3	0.6–2.8
Curriculum delivery method		
Traditional classroom	0.4	0.2–0.7
Traditional classroom with some e-learning	1.6	0.8–3.1
1/2 traditional classroom & 1/2 e-learning	0.9	0.5–1.8
E-learning with some classroom meetings	1.2	0.6–2.3
Entirely e-learning	0.8	0.4–1.6
Prerequisite education		
Bachelor's degree in dentistry	3.6	1.8–7.4
Associate degree in dental hygiene	0.3	0.1–1.3
Bachelor's degree in dental hygiene	1.1	0.6–2.1
Associate degree in dental assisting	5.3	1.3–22.1
Associate degree in dental laboratory technology	0.3	0.1–1.3

<30 years of age is the reference category.
† Proportional odds ratio (POR) models the probability of choosing the highest score on the 4-point Likert scale (4 = strongly agree).

Table 5 Preferred teaching strategy, curriculum delivery, and prerequisite education for DPH graduate education by qualification (specialists versus general practitioners).

Variable	POR[†]	95% CI
Teaching strategy		
Textbook	6.0	2.9–12.3
Lecture	0.9	0.5–1.8
Discussion/presentation	1.7	0.9–3.4
In-class seminars	3.5	0.9–13.0
Skills/activity	3.7	0.9–14.8
Laboratory	1.1	0.3–4.2
Field experience	3.3	0.8–13.5
Journal article review	5.3	1.2–23.8
Collection of examples	0.7	0.3–1.5
Homework problems	3.6	1.6–7.9
Solution to homework problems	1.7	0.8–3.7
Database of test questions	1.9	0.9–4.0
Curriculum delivery method		
Traditional classroom	0.5	0.3–1.0
Traditional classroom with some e-learning	2.4	1.2–4.8
1/2 traditional classroom & 1/2 e-learning	0.7	0.4–1.4
E-learning with some classroom meetings	0.8	0.4–1.6
Entirely e-learning	0.7	0.4–1.5
Prerequisite education		
Bachelor's degree in dentistry	4.6	2.2–9.7
Associate degree in dental hygiene	0.8	0.2–3.1
Bachelor's degree in dental hygiene	0.5	0.3–1.0
Associate degree in dental assisting	0.6	0.2–2.2
Associate degree in dental laboratory technology	0.4	0.1–1.6

General practice is the reference category.
[†] Proportional odds ratio (POR) models the probability of choosing the highest score on the 4-point Likert scale (4 = strongly agree).

4. Discussion

In this study, a needs assessment for developing a master's program in DPH in Saudi Arabia was conducted. This survey expanded the original sample population of KAU dental faculty to include private dentists and other government-employed dentists, and it validated many of the views held by academic dental professionals regarding the development of a structured education in DPH.

The results of the survey clearly indicate a need for starting a graduate program in DPH at KAUFD. Most respondents preferred seminar series and workshops over a master's degree program to obtain knowledge about DPH, although the Survey II population preferred a more traditional form of graduate education. This is probably a factor of survey sample characteristics. For example, dentists who have completed graduate education and hold academic positions (such as the respondents in the Survey I population) preferred less intensive programs compared to dentists that were employed in other government sectors and were mostly general practitioners. The latter group may also have a greater perception of the need for DPH practice among the population they serve, whether it is through oral health promotion, public health policy, or research, as well as the need for a graduate degree to advance their position or ranking.

The majority of respondents preferred to learn in a traditional classroom setting with some electronic technologies used to access educational curriculum outside the classroom. It has been described that the traditional format is more convenient, it facilitates group activities and discussion, and it promotes the development of public health leadership (Dodds et al., 2003). Yet, this mode of education could be a barrier to those who cannot relocate to enroll in a graduate program (Dodds et al., 2003). Distant education programs in public health are offered at several universities in the United States, and some universities offer online master's degrees in DPH to students concurrently enrolled in a school of dentistry accredited by the Commission on Dental Accreditation (CODA; ASPH Website). It is possible that offering elective courses through a distant education format may provide a good starting point for evolving a master's program in DPH at KAUFD.

In general, most respondents were in favor of a bachelor's degree in dentistry, followed by a bachelor's degree in dental hygiene, as preferred prerequisites for graduate DPH education. Currently, the role of dental hygienists in DPH exceeds their role as dental educators. Hygienists in many parts of the developed world plan and administer DPH programs, are faculty members in community dentistry departments, and are involved in DPH research (Burt and Eklund, 2005). Therefore, it is important that a graduate program in DPH in Saudi Arabia target dental hygienists as well as dentists.

The present findings also indicate that most respondents reported having basic knowledge and moderate experience in DPH practices and competencies, yet, they reported a substantial need for this knowledge and experience in their everyday practice. This gap between level of experience and importance given to these skills is another indication of the need for a structured education in DPH. These findings can also serve to guide the design of course content for the proposed master's degree program, whereby course objectives will be focused in areas where competency levels are lower and importance is ranked higher.

Finally, the significant odds of having higher DPH competency scores among older dental practitioners and specialists, compared to younger and general practitioners, indicate that there is a potential pool of students for a master's program in DPH. These students represent the prospective needed DPH practitioners or researchers.

The strengths of the present study include its large sample size and reasonable response rate. Expanding the original study population to include general practitioners, private dentists, and dentists working in other government dental health sectors addressed a limitation of Survey I and enhanced the external validity of the present results. Furthermore, the modification of the survey questions more effectively addressed most of the needs perceived by dental health professionals for a structured educational program in DPH. A limitation of the present study was the difficulty in accurately estimating the overall response rate. It is not known if the attendees of the SDS meeting who did not respond to Survey II were true non-responders or they had previously responded to Survey I. Therefore, it is possible that our actual response rate is better than the minimal response rate reported here.

5. Conclusions and implications for graduate DPH education

The need for trained and skilled DPH practitioners is absolute and irrefutable given the current rates of oral disease, ineffective oral health promotion programs, wasted resources, and lack of DPH leadership. Thus, the DPH needs assessment survey is considered the groundwork for the formative planning of a well-structured DPH program at KAU. The majority of dental professionals that participated in the survey acknowledged the need for DPH graduate education. The responses from the survey exposed gaps in the knowledge and practice of DPH, provided feedback regarding course content development, and assisted in evaluating the resources available for building a DPH program.

This assessment of the need for DPH graduate education comes at a time when many academic institutions across the country are realizing the impact of this dental specialty on a population's oral health and well-being. For example, the College of Dentistry at King Saud University in Riyadh is considering restarting their DPH Masters Program, which was previously offered in 1993 and then was closed after graduating their first class (S. Al-Sadhan, personal communication, April 14, 2014). Meanwhile, Riyadh Colleges of Dentistry and Pharmacy (RCsCP), a private university, has been approved by the MOHE to start a master's program in DPH (RCsDP website). The need for DPH education and practice is also advocated by schools of medicine throughout the country (Milaat, 2007). Correspondingly, several schools of medicine, as well as government organizations, have recently launched Masters in Public Health (MPH) programs. These programs are offered to physicians, dentists, dental hygienists, nurses, nutritionists, and other health professionals.

The majority of dental graduates in Saudi Arabia are employed by the MOH (MOH, Health Statistics Book, 2012). These dental practitioners are potential candidates for a master's degree in DPH where the need for public health dentistry is greatest and the impact on the population's oral health would be significant. However, despite these facts and the stated mission of the MOH that conforms with the purpose of a DPH program [''promotion of general health and prevention of diseases'', ''performance monitoring in health institutions'', and ''research activity...in the field of health investment''] (MOH website), the MOH does not finance, nor support, graduate DPH education. Rather, dentists affiliated with the MOH are persuaded to pursue graduate training in clinical dental specialty programs. The MOH's reasons for declining applications to graduate DPH education are based on the discouraging experiences of formerly supported DPH specialists (M.A. Al-Rafee, personal communication, April 13, 2014). As a result, the denial of DPH applications by the MOH has turned away applicants who are truly interested and seeking a career in public health, as well as their access to scholarships to support this field of study.

In the United States, the Standards for Advanced Education Programs in DPH were formulated by the CODA of the ADA and they require two years of graduate education in DPH. A dentist with an MPH degree from any school of public health that is accredited by the Council on Education for Public Health needs an additional year of training in DPH. This year usually consists of a one-year DPH residency in a program accredited by the CODA. Two-year educational programs are also offered exclusively at schools of dentistry that are accredited by the CODA. These programs provide a curriculum in general public health education in addition to residency training in DPH (Shulman et al., 1998). Accredited DPH residency programs prepare dental residents for a specialty examination that is conducted by the American Board of Dental Public Health (AAPHD website).

In light of these programs and the acceptance of two years as an adequate standard for masters programs accredited by the Saudi Commission for Health Specialties (SCHS; SCHS website), the proposed postdoctoral education in DPH at KAUFD may be offered as a two-year full-time program to dentists without an MPH or its equivalent. During the first year, the students will primarily acquire knowledge in public health sciences. In the second year, students will engage in DPH residency activities, thereby acquiring skills and training in the competencies identified by the AAPHD (AAPHD, 1998). Students in their second year will also complete any pending MPH requirements. The residency training will include didactic instruction, acquisition of research skills through the design, conduct, and reporting of public health research, and application of DPH competencies as part of an off-site field experience that would include completion of a fieldwork practicum report. Dentists who have an MPH degree and are seeking training in DPH can join the second-year DPH residency training.

To achieve the desired goals and objectives of establishing graduate DPH education programs in Saudi Arabia, the planning and implementation of these programs should consider both the design and structure of the curriculum, as well as the building of a DPH coalition to advocate for the implementation and amendments of policies to promote effective DPH education and DPH practice in Saudi Arabia. Furthermore, DPH specialists, dental educators, government officials, and policy makers in Saudi Arabia need to achieve a consensus regarding the best strategies and regulations that will guide and promote effective DPH practice in this country.

Conflict of interest

The author declares that there is no conflict of interest.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.sdentj.2014.12.002.

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